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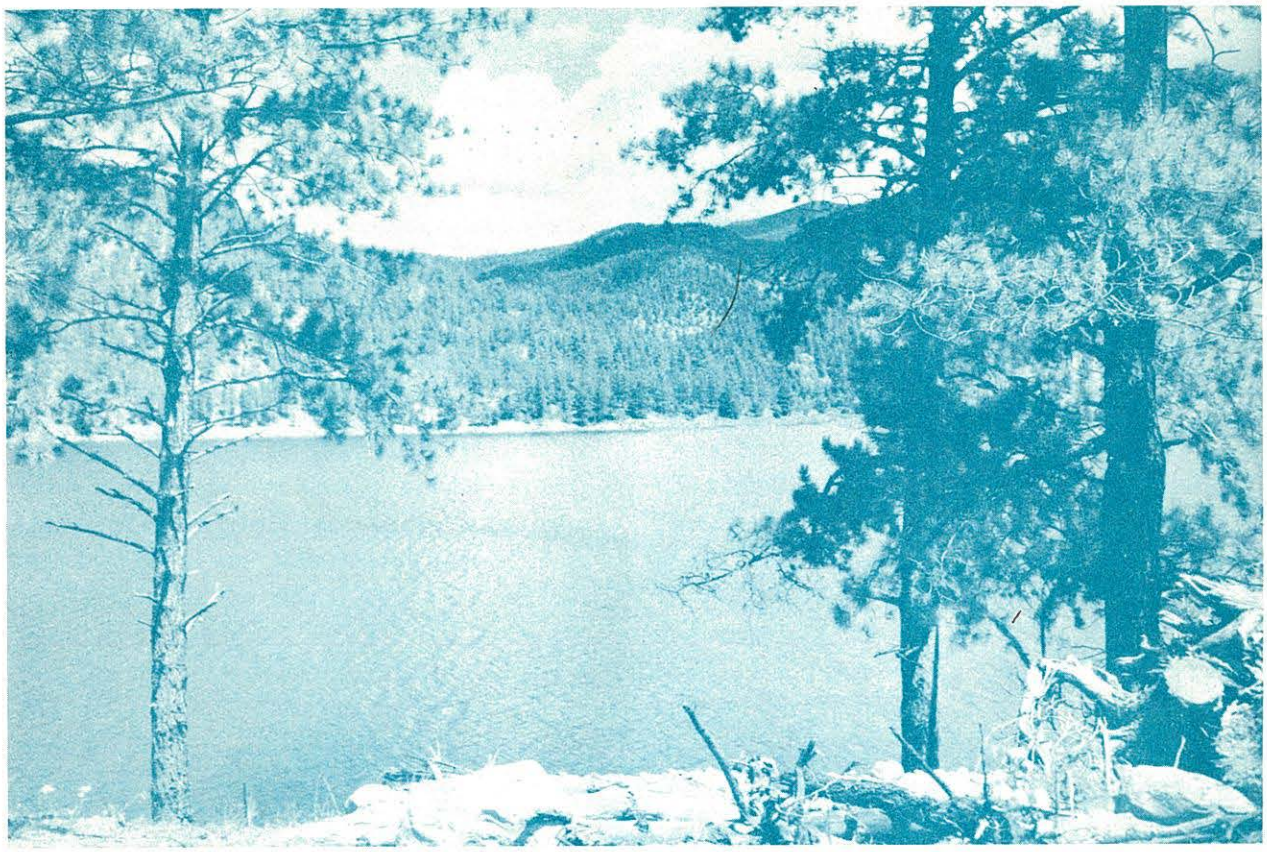

FORESTS and WATER

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SOUTHWESTERN REGION

FORESTS and WATER

The panel members who preceded me have done an excellent job in explaining the water needs in the Southwest for agriculture, urban areas, and range forage production. They have also covered the fields of research in watershed management and the needs of our original Americans, the Indians. I will confine my remarks today to water and its relationship with other forest resources or uses on the National Forests here in the Southwest. Most of the water available to Arizona and New Mexico falls to earth on National Forest lands, and this puts the Forest Service very much in the water business. But, it's not our only business, as you all know. My job today is to show you that managing the National Forests is a more complex business than managing for any one of the forest resources alone. Perhaps the best way to do this is to first tell you something about each of these forest resources on the National Forests and what they are worth to the people of the Southwest. I'll start with timber:

Most of the ponderosa pine areas in these two states — Region 3 as we call them in the Forest Service — have been cut over once on a tree-selection basis. We are just getting a good start in the harvesting program for the majority of the spruce-fir timber at the higher elevations. Of the estimated annual allowable cut for all saw timber species on the National Forests—366 million board feet — over 300 million was cut during 1956. We hope to be able soon to harvest the entire allowable cut on all National Forests in the region. The total harvested in 1956 had a value on the stump of close to 3 million dollars.

This paper was given by Regional Forester Kennedy at the 83rd Annual Meeting of the American Forestry Association at Tucson, Arizona, on October 29, 1958.

The sawmills processing this material, some 200 in the two states, employ about 4800 workers in the mills and woods, and a large number of workers are also employed in transportation and manufacture of finished wood products. The National Forests in the region supply about 63% of the timber used by these mills. The present market value of timber products from all forest lands in the region is estimated to be $33 million a year f.o.b. at the mill.

Recently a sale was made by the Forest Service of 6 million cords of pulp material which involved six National Forests in the region. It is planned by the purchaser to construct a 30-50 million dollar pulp plant at Snowflake, Arizona. The material to be processed in this plant will consist largely of ponderosa pine thinnings, mill waste and timber residue now being left in the woods from sawlog operations. The thinning in both the ponderosa pine and other timber types will improve the growing conditions and make it possible to utilize thousands of tons of wood now being totally wasted. This one venture will employ an additional 200 people. So you can see that the timber resource in the Southwest is an important economic asset to an industry-short area.

Another important resource of the forest is recreation. About 30 years ago the road into Oak Creek Canyon on the Coconino National Forest was improved causing a big increase in use. The local ranger stated there were 400 recreation visitors that year. He predicted recreation use might double in 5 years because of road improvement. In 1957 approximately 200,000 people — a 500-fold increase over 30 years ago — visited and used the campgrounds in Oak Creek Canyon. The increase in use of the recreation areas on the National Forests is keeping pace with our rapidly increasing population in this fastest growing corner of the nation. In 1947 about one million visits were made to the

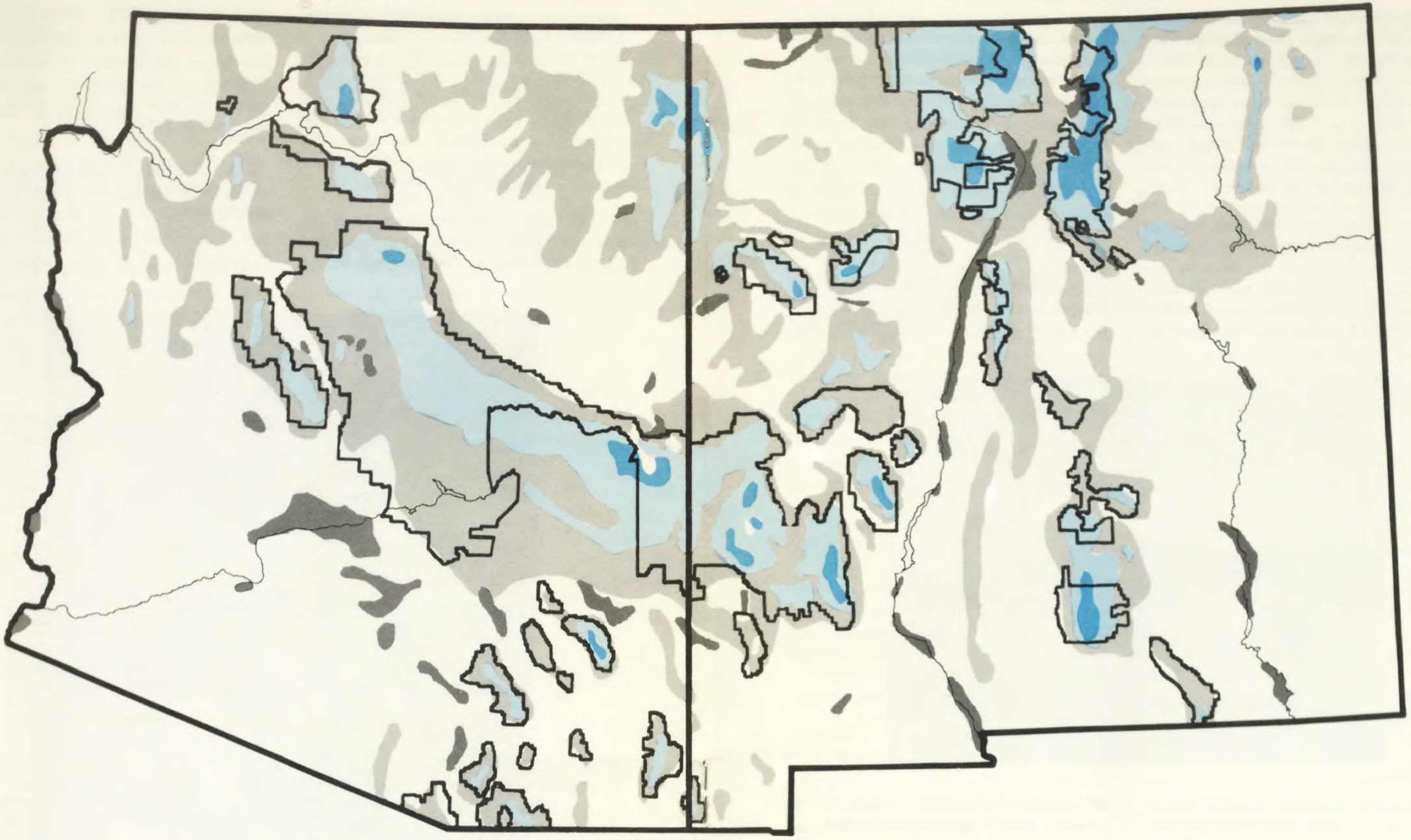
camp and picnic areas in the 12 National Forests of Region 3. In 1957 this had increased to 5 million visits and it is our estimate that by 1960 it will be 6 million visits and by 1965 close to 8 million visits a year. Arizona in 1910 had around 200,000 people; today it has almost 6 times that number and is still growing. New Mexico has not yet reached the one million mark, but at the rate it is growing this won't take long.

The higher, cooler mountain areas of the region are thus at very much of a premium during the hot summer months — not only for the people of Arizona and New Mexico but neighboring states as well. These mountain areas not only give relief from the heat but provide outdoor recreation which is enjoyed by most Americans. In the past ten years the number of summer home residences in the National Forests here has doubled. There are over 1300 of these residences at the present time. This number could be increased many times if there were room to take care of the demand. Again, it is easy to see that the National Forests in the Southwest are extremely important in providing outdoor recreation opportunities for an expanding American people.

As to hunting and fishing, the most popular of our sports, the National Forests provide the bulk of the big game habitat and a substantial part of the region's trout fishing. In 1957 approximately 46,000 big game animals were harvested in the Southwestern National Forests, the majority of these animals being deer. Other big game animals of importance are elk, antelope and javelinas. Most of the forests also have a good population of wild turkeys. 200,000 hunter visits were made in harvesting this game. There were almost 500,000 fishermen visits to the National Forests during 1957. 65 lakes ranging in size

ARIZONA

NEW MEXICO



VEGETATIVE ZONES IN RELATION TO NATIONAL FORESTS

SPRUCE

PINE

PINON - JUNIPER
CHAPARRAL

IRRIGATED LAND

from several acres to several thousand acres have been artificially developed, many of them by the Game and Fish Departments on the National Forests in the region. Some of these are being managed primarily for fishing. In addition, there are some 2000 miles of fishing streams. It is rather obvious that the National Forests and their management are very important to the hunter and fisherman in the Southwest.

Although Dr. Humphrey has fully and capably covered forage production in his presentation, I'd like to say a word or two about the importance of the National Forests to the livestock industry. In 1957 over 220,000 cattle and 147,000 sheep were grazed on the National Forests of the Southwest by about 3,000 ranchers. These livestock make up about 11% of the total produced in Arizona and New Mexico. This is another important forest use.

In discussing water, I'd like to refer to the map of Arizona and New Mexico on pages 4 and 5 to give you a rough idea of the size and scope of the vegetative zones in the region. The map shows the National Forests of these two states in relation to the major types of mountain vegetation. It is clear that these types are basically a measure of the rain or snowfall in each elevation. As you will note, starting at the higher elevations the mixed spruce, fir, aspen and subalpine types are shown in dark blue, with an average of about 30 inches of precipitation a year. Below this is the ponderosa pine zone in light blue, getting 20 to 28 inches or so annually. Surrounding that the pinon, juniper and chaparral areas are lumped together as light gray, with a 10 to 20 inch annual rainfall. The high, wet grassland areas have been included with the dominant timber types, but the low-level, dry rangeland and desert shrub areas within the National Forests have been left white. Of the 20 million or so acres of National Forest land in the Southwest, one million are in the dark blue or

spruce-fir type, almost 5 million are in the light blue or ponderosa pine type, and 14 million are in all other types including woodland, chaparral, desert shrub and low elevation grassland. You may be wondering what those strips of dark gray are doing running down the major river drainages of the two states, mostly outside the National Forests. Those indicate the main irrigated lands of Arizona and New Mexico, the ones most concerned with water from the mountains. Now if the forest plant cover is to be manipulated to increase water yield, then the areas where this could most likely be accomplished would be the spruce-fir zone and the ponderosa pine zone, the dark and light blue, respectively. At least from the water production angle, these are the areas which show the greatest promise. As indicated by Director Ray Price, this assumption is supported by research findings developed in other areas in the West for these two vegetative zones. I might point out here, however, that increased streamflow brought about by watershed treatment high in the mountains may not necessarily bring more water to the valley floor for crops, industry, or domestic use. Hundreds of miles of thirsty streambeds may swallow up whatever increase we cultivate in the high country unless improved means of transporting the water to the lowlands are devised. It is estimated for example that 50 to 75 percent of the flow in our desert rivers never gets used by man but disappears in streambeds, seepage, rampant streamside vegetation and other losses.

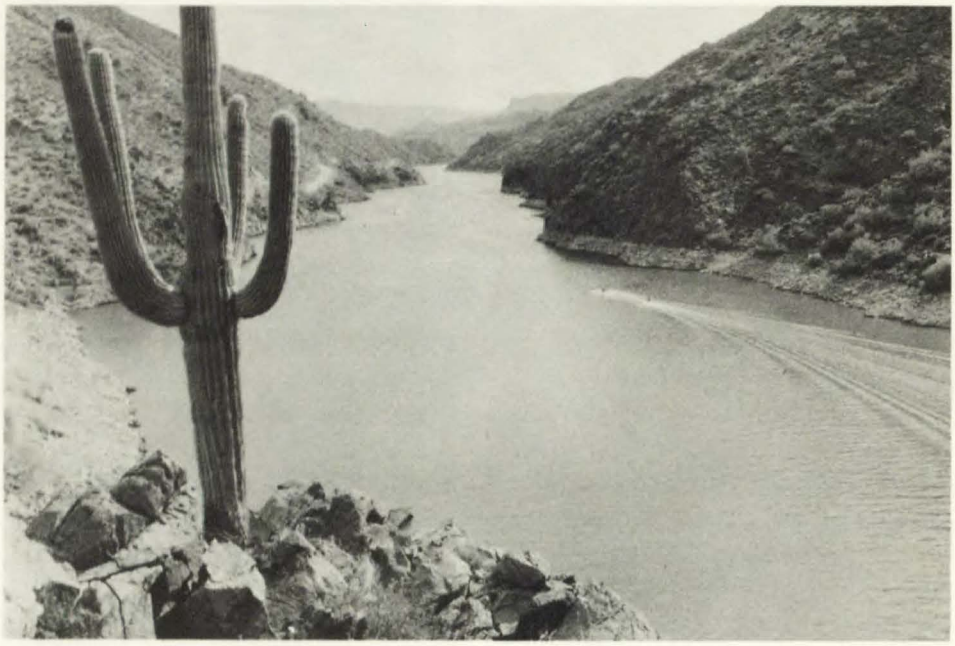
However, on the assumption that the spruce-fir and ponderosa pine can be managed to yield more usable water, let's take a look at these areas from the viewpoint of the other resources. The ponderosa pine and spruce-fir types make up only about 30% of the total area of the National Forests in the Southwestern Region, but they provide most of the resources for the bulk of the users. As to water, the pine zone and higher areas average twice as much water per acre as the lower elevation woodland and chaparral and at least three times as much per acre as the surrounding desert. At the same time the pine and up areas provide practically 100% of the timber production, 85% of the recreation visits, 65% of the big games harvest, 65% of the fishing use and 33% of the livestock use on the National Forests. It is therefore quite obvious that the area which might produce or yield more water through changes in management is also the area supporting most of the forest uses in the region.

All of the other uses or resources require water. Timber needs water for growth of trees, for log ponds for the 200 mills in the region; and I am told that the proposed pulp project at Snowflake will need at least 10 million gallons per day to operate its plant. We are already experiencing difficulty with the health authorities in attempting to supply water for the present recreation load. Our efforts to date are far short of an acceptable standard. I hesitate to think of the future as far as this problem is concerned. The fishing resource cannot exist without water; and to maintain proper temperatures for fish on many of our streams here in the Southwest, shade provided by trees is a must. Both big game and livestock require water. The 3600 or so water developments for range animals emphasize this, 1/3 of these being in the much-desired pine and spruce-fir zones. In effect, most of the forest uses are in competition among themselves for water; and when the bulk of them are concentrated on 30% of the area of the forests, any effort to increase the yield for "off site" purposes is going to require some skillful management, to say nothing of diplomacy.

Now, just what does this all mean in the management of the National Forests in the Southwest? The original charter for their man-

agement, an Act of Congress of June 4, 1897, provided that the National Forests would be managed to secure favorable water flows and to produce a continuous supply of timber for the people of the United States. When the National Forest system was established by Theodore Roosevelt, he saw to it that the policy would be that the National Forests would be managed for the greatest good of the greatest number of the people in the long run. This policy is still in effect today. These directives for the management of the National Forests, topped off with the fact that water is probably the most important resource for the development, enjoyment, and survival of the Southwest, mean that somehow it will be necessary to apply the multiple use concept and still get the best water yield possible from the lands.

As explained by Ray Price, if we had more of the answers on the many interrelationships between water and the other forest resources, a much better job of producing the optimum amount of water with the least disturbance of the other resources could be accomplished. Research has determined some fundamentals regarding some of the relationships. From these findings, pilot test projects of considerable size and scope have been started in the ponderosa pine, the spruce-fir, aspen, and pinon-juniper types on the National Forests. These tests are on National Forests located here in Arizona. Through these pilot tests we plan to develop management practices for all resources which will provide the optimum conditions for the production of the water and still make it possible to have the other uses. Some uses undoubtedly will have to be curtailed while others may actually benefit from the practices which may be developed to improve the water flow.



This reservoir in the National Forest provides water for both irrigation and recreation.

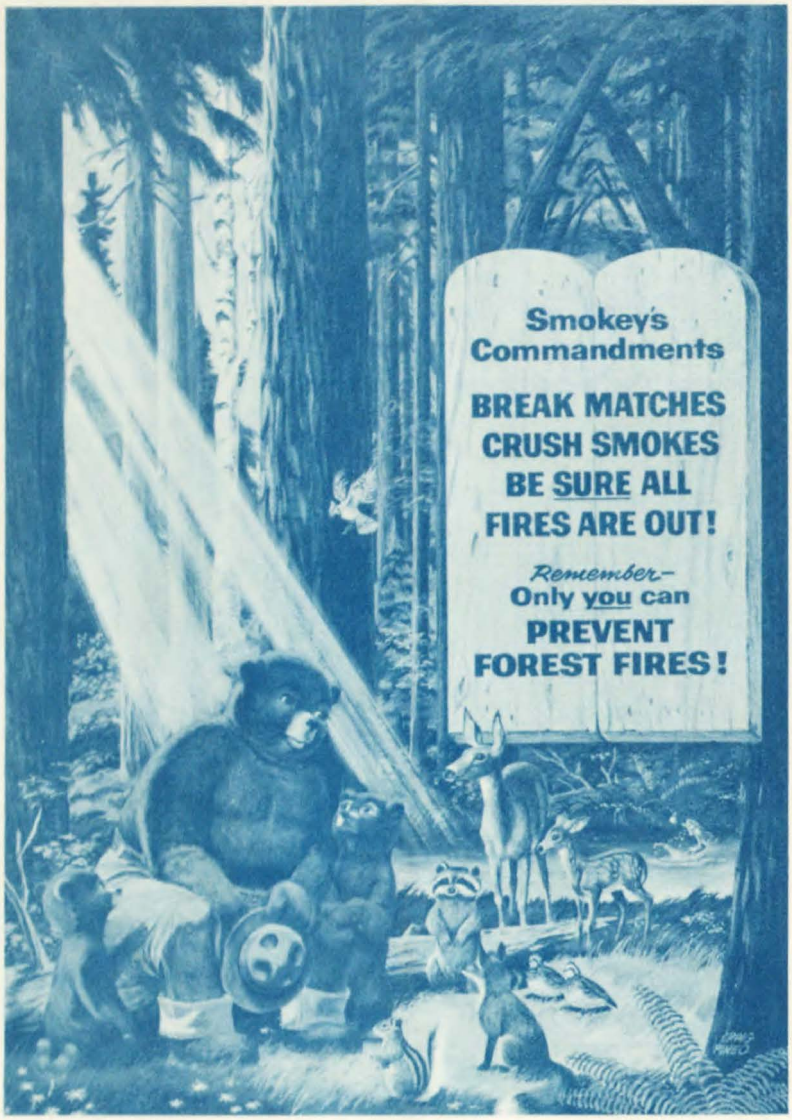
At least the pilot test approach is a positive one and the tests to date consist of about the following:

In the ponderosa pine type one test concerns complete conversion of the tree cover to grass or forage cover. We are also testing the effect of the application of best known silviculture practices in the second growth pine stands on water yield. This includes thinning or pruning the pine and removal of all undesirable tree species in the stand. Block or patch clear cutting is being tested in the spruce-fir type. Again, complete conversion of the tree cover to a forage cover will be tested against methods of cutting or management which will increase regeneration of the better tree species. The pinon-juniper test will compare areas completely converted to grass and other forage plants with undisturbed woodland stands. The area of the drainages where the tests are being made range from about 200 to 2000 acres. In addition to determining the effects of these treatments on water yield, we also are watching closely their effects on forage, wildlife, and timber production.

The pilot test program is being done cooperatively with Forest Service Research and Agriculture Research Service people, the Arizona Water Resources Committee, the Arizona State Game Department, the Water Division of the U. S. Geological Survey, and a number of other agencies and interested organizations. It was started in 1957 and so far the results have been largely learning the "whats" and "hows" for doing the job. One thing is certain, however; we don't plan to alter present satisfactory management practices until more information is available from the pilot test projects. In other words, we want to know what we are doing and how much it will cost before recommending a large scale program to improve the water flows at the expense of the taxpayer.

In my attempt to show that a majority of the forest users are located in the principal water producing areas, I hope you haven't been given the impression that our chances for producing more water aren't good. This was not the intent. I intended to be realistic and point out some of the management problems which will be involved in a vegetative conversion program on the forests. I am confident that some additional water can be produced without too much disturbance of the other uses. As indicated, however, the accomplishment of this will require skillful management based on the best facts obtainable from research and the pilot test projects. It will be difficult and I hope we are more successful in satisfying the various users than a Persian traveler of several centuries ago. Mullah, the traveler, and his small grandson were entering a Persian village on his donkey. He heard the people of the village say as he passed through, "Why should the poor donkey be overloaded with both the old man and boy riding him?" Mullah then got off and let the boy ride. In the next village, the villagers said, "Why should a young boy ride and the old man walk?" Well, Mullah changed that by having the grandson walk while he rode the donkey. The people in the next village said, "Shame! You a full grown man riding and making the small boy walk." Mullah crawled off the donkey, shrugged his shoulders and said, "What a wonderful world we live in. You cannot please any of the people any of the time."

FOREST SERVICE, U. S. DEPARTMENT OF AGRICULTURE, SOUTHWESTERN REGION
ALBUQUERQUE, NEW MEXICO


Smokey's
Commandments
BREAK MATCHES
CRUSH SMOKES
BE SURE ALL
FIRES ARE OUT!
Remember–
Only you can
PREVENT
FOREST FIRES!